Geophysical Research Abstracts
Vol. 16, EGU2014-14199, 2014
EGU General Assembly 2014

The change in the shallow plumbing system of Mt. Etna (Italy) during 2001-2005

Marco Neri (1), Salvatore Giammanco (1), Giuseppe Salerno (1), Tommaso Caltabiano (1), Michael Burton (2), and Vincenza Longo (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Sezione di Catania, Italy (marco.neri@ct.ingv.it, +39 095 7165858), (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, 56126 Pisa, Italy

We analyzed crater SO_2 fluxes from Mt Etna (Italy), together with soil CO_2 effluxes from the volcano's flanks, in the period from 2001 to 2005. Between the 2001 and 2002-2003 flank eruptions, persistently low values of both parameters suggest that no new gas-rich magma was accumulating at shallow depth (< 5 km) within Etna's central conduit. Whereas very high SO_2 sin-eruptive fluxes during the two eruptions indicated sudden decompression of an un-degassed magma rising in along newly-formed eccentric conduits. In November 2003, soil CO_2 data indicate migration of gas-rich magma from deep (> 10 km) to shallow (< 5 km) portions of the feeding conduits, preceded by an increase in crater SO_2 fluxes. A similar behavior was observed also during and after the following 2004-2005 eruption. This degassing style matches a period of increased structural instability of the volcanic edifice caused by acceleration of spreading that affected both its eastern and southern flanks. Spreading could have triggered progressively deeper depressurization in the central conduit, inducing release of the more soluble gas (SO_2) first, and then of CO_2, contrary to what observed before the 2001 eruption. This suggests that the edifice has depressurized, promoting ascent of fresh-magma and increasing permeability favouring release of CO_2 flux. By integrating geochemical and structural data, previous degassing models developed at Mt. Etna have been updated to advance in the understanding of eruptive events occurred in recent years.